



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Notice of Determination
Integrated Resource Management, Inc. – Ashley Meadows Subdivision Wastewater
Treatment Plant
State Operation Permit Number SOP-07006

September 25, 2007

Introduction

This Notice of Determination (NOD) addresses the State Operating Permit (SOP) for the Ashley Meadows Subdivision. The SOP does not allow a direct discharge of treated wastewater to waters of the State. It does allow treatment of wastewater and land application of wastewater. The applicant has proposed to use drip irrigation which is underground application of treated wastewater. The permit allows septic tanks at each individual home with pumping of the septic tank effluent to a collection system which will flow to a recirculating fixed media biological reactor (sand filter). The effluent from this system will receive ultraviolet radiation disinfection and then will be pumped to a drip irrigation system.

On December 28, 2006, the Ashley Meadows Subdivision submitted an application for a permit for the land application of wastewater from a drip irrigation system. The Tennessee Department of Environment and Conservation, Division of Water Pollution Control (the division) received the application in December 2006 and published a draft SOP on March 19, 2007.

On April 23, 2007, the division announced that a public hearing would be held regarding the permit. That public hearing was held on June 26, 2007, at the Blount County Public Library, 508 N. Cusick Street, Maryville, TN 37804. This Notice of Determination (NOD) addresses the citizen comments and questions presented at the hearing and submitted during the 10-day official comment period (ending July 10, 2007). It also presents TDEC's decision regarding the permit and the rationale for that decision.

Project Description

The population being served by the drip irrigation system is approximately 14 homes (lots) in the Ashley Meadows Subdivision.

The following is a summary of the comments/questions received at the public hearing and during the public notice period and includes the division's response:

1. Residents are concerned for the health, welfare, and investments of the development of Ashley Meadows Subdivision

The Division of Water pollution Control (the division) has issued numerous permits for drip irrigation systems which are installed and operating across the state in all sizes of subdivisions. Most of the systems are similar to this one and use septic tanks, sand filters and drip dispersal. The systems are generally below ground and have no odor. This type of system should not have a negative impact on home values. There are several very nice developments associated with these systems. They require a small control building (usually the only part above ground). The drip dispersal areas look like open fields, which can be placed in front of the homes with nice fences around them. The IRM Utility, Inc is in good standing with the division. The division has had no complaints about IRM Utility. IRM Utility is not only regulated by the division's operating permits, but as a privately owned public utility, is regulated by the Tennessee Regulatory Authority. The Tennessee Regulatory Authority is the same agency that regulates the cell phone and cable companies. Their primary objective is to see that anyone in the public service business treats their customers fairly.

2. Are there documents available for public reviewing to confirm this?

All of the division's files are open to the public and anyone is welcome to come to Nashville or the Knoxville Field Office to review the files. The Tennessee Regulatory Authority identifies utilities under its jurisdiction on its webpage at <http://www.tennessee.gov/tra/telecomfiles/listofregulatedutilities.pdf>.

3. Has the division received any complaints about these filtration systems installed by IRM?

Enforcement and Compliance is a separate section within our division. The division has not received any complaints from these types of systems installed by IRM. The division has received very few complaints overall on these types of systems installed across the state.

4. Who will be responsible for ongoing long-term maintenance of this system? Are they qualified and certified? How is maintenance scheduled?

The long-term maintenance is performed by the privately owned public utility under the requirements of our permit and under the requirements of the Tennessee Regulatory Authority. These types of systems do require maintenance, but not to the level of the more sophisticated wastewater treatment plants that require a daily operator. The division encourages routine maintenance of these systems and a prompt response to emergencies.

5. Will there be a control panel to alert the appropriate and responsible persons when there is a problem?

All of IRM's systems are equipped with telemetry. The telemetry uses a sensi-phone telephone that relays high water and temperature alarms. They also give us power failure alarms. The permittee maintains back up battery packs that warn when batteries are getting low. The telemetry that was used with past systems is now being replaced by better cellular telephone telemetry. The status of the system can be accessed daily, weekly, through the telemetry or any other schedule.

6. How quickly are you expected to respond?

Typically there are two places where a critical condition may occur. The first place is at the household itself where there is a septic tank effluent pumping system. The IRM design uses an oversized pump tank that has two days of normal flow storage capacity. During a power outage it has been found that flows are generally much less than normal. Because these tanks are one thousand gallons in size, there are a few days of storage time for response. If the problem is a pump that goes out at the tank, there is a day and a half of retention time in the system for typical water use. On the treatment system itself, the recirculation tanks typically can handle the system for about eight hours.

7. What is the price of these systems?

Cost of these systems will vary with the specific development, but a good rule of thumb is \$10 a design gallon. For this particular project the developer pays for the system. The permittee monitors the system as it is installed to make sure it is built according to specifications. The permittee won't take it over unless it is built according to specifications. The operation and maintenance cost to the consumer is determined according to the tariff that is approved by the Tennessee Regulatory Authority. This will be the cost that the consumer pays on the monthly bill.

8. What about bonding?

The Division of Water Pollution Control does not require a bond for systems where the permittee has obtained a Certificate of Convenience and Necessity from the TRA. However, the TRA requires a \$20,000 bond. In the event of default or abandonment by the permittee, there are provisions within the regulations of the TRA for the TRA to take charge of these resources and assign another company to operate the system.

For multiple home systems such as this one, the division generally requires them to be operated by sewer agencies such as a public utility or a privately owned public utility.

9. Does a percentage of the homeowner's monthly fees replace this system as it ages and needs replacement?

Yes, a percentage of the homeowner's monthly dues go into an escrow account used for long-term repairs and/or replacement.

IRM anticipates better telemetry, better pumps and other system improvements. When the permittee must make these replacements in the future, it is probable the escrow will fund advanced technology that is more efficient and more effective.

10. Is there an irrigation field?

Yes there is an irrigation field. The division promotes these systems as having three levels of treatment, a primary level, secondary level, and a tertiary level. The primary level is the septic tank at each house. The secondary level is the fixed media recirculating biological reactor. It basically uses bacteria, attached to a fixed media, to further break down the wastewater, convert ammonia to nitrate and produce a clear effluent. It is much clearer and much, much better than effluent from the septic tank. In this case it is also going to be disinfected. The wastewater then goes to the tertiary treatment which is the land application. The land application is by drip irrigation which involves piping that is buried underneath the soil. The pipes, buried at about 6 to 10 inches deep, are designed to allow the wastewater to drip out of orifices placed approximately 2 feet apart along the pipe. The slow drip rate is such that it prevents the wastewater from breaking out onto the surface of the ground and allows the soil bacteria to further break down organic matter. It also allows the plants to uptake the nitrogen and phosphorus.

11. What is the appropriate application rate on the irrigation field?

The application rate of wastewater is determined based on a number of factors primarily relating to the type of soil conditions at the site. The determination is made to assure that the irrigation site can assimilate the quantity of water being applied and the quantity of nitrogen being applied on a month-by-month basis. It was determined that for this site 1/10 gallon per day per sq ft, which is about 1.1 inches per week, was appropriate.

12. Where are these regulations documented and are they available for public viewing?

There is not a regulation that deals with the application rate. However, we have existing design criteria that applies and proposed design criteria (these are a working document that we are preparing to replace our existing criteria.) Our existing criteria are good and, although they were written for spray irrigation only, they work quite well for drip irrigation.

13. Have there been any new regulations established as John Buchanan had said were being established?

New design criteria are being established and this system will comply with those criteria.

14. How many of the 260 drip irrigation systems have already been built?

About 95% have been built.

15. How many of the 260 drip irrigation systems are in this local area?

They are 20 systems are operating in Blount County.

16. Does slate rock affect the system from operating properly?

Shallow bedrock within just a few inches of the surface would affect it and that is not the case for this permit. Small rocks within the soil do not pose a problem. We have lots of systems that work just fine in those kinds of conditions. Each site must be evaluated by an independent soil scientist and their report is reviewed by TDEC personnel. Where marginal soils are involved, a site visit is made by a TDEC soil scientist.

17. Has there been any kind of environmental studies done prior to checking the soil and maybe some other environmental studies prior to the system going in? Also, will there be any further test done after the fact?

As discussed above, the site was evaluated by an independent soil scientist who undertook borings on the site and mapped the soils. His report was reviewed by TDEC personnel. No further soil tests are anticipated. However, the permit calls for monthly flow measurement and quarterly sampling and testing of the treated wastewater discharged to the drip irrigation area. The permit requires the treated wastewater be tested quarterly for ammonia, nitrates, and for bacterial contamination levels.

18. Who will build the drip irrigation system?

The permittee provides engineering design of the secondary treatment plant and the drip irrigation system which must be approved by the division. The permittee will select a contractor to build the system.

19. How long is this system expected to last? What is the longevity of this system?

These treatment systems are composed of a number of parts which have varying life expectancies. Pumps, valves, solenoid valves, and things like that may have to be replaced in a 5 to 15 year time frame. The main units, septic tanks, fiberglass tanks, and underground piping would be expected to last from 30 to 50 years.

20. What about the irrigation field itself?

The drip irrigation lines are made with polyethylene plastics that should last in the 30 year range. The pipes are impregnated with a root guard in them but eventually roots may present a problem. However, the lines can simply be replaced in the existing irrigation field. The line is relatively inexpensive and can be plowed in just like telephone cable.

Because the secondary treatment system produces a highly treated effluent, it is not anticipated that the soil of the drip area will become clogged over time.

21. Is there additional space in this subdivision for duplication?

Because of the high quality of the secondary treated effluent, the division does not require duplicate area for the drip irrigation sites. If in the unlikely event there is clogging around the existing lines, new lines can be placed between the existing lines.

27. Does that mean that all of us in the rest of the subdivision are going to have problems with our septic because there are problems everywhere in the subdivision?

Properly designed and operated conventional septic tank and drainfield systems can operate for many years without problems. Each lot will have somewhat different soils and different homeowner use of the system. The fact that a decentralized treatment system has been proposed for some of the lots does not imply that it is (or will be) required for all lots.

28. Are all the lots approved? The system is going to be built on how many of these lots?

The permit allows 14 lots to be served. However, Mr. Cox is planning to serve 12 lots initially with a reserve for 2 additional lots with failing septic tanks. Because the design flow required by the division (300 gallons per home per day) may be greater than actual flows that the treatment system will experience, it is possible that the system may be able to serve additional lots with failing septic systems.

29. How many houses do you extend to?

Refer to # 28. Reserving a future connection to the system above 14 lots will require modification of the permit. The scheduling of who is first to receive such a connection is to be worked out between the homeowners and IRM.

30. Does it say in the covenant that you are able to build this system?

The state SOP does not address the development covenants. The division has authority under the Tennessee Water Quality Control Act to issue an operating permit to the permittee and to approve plans and specifications for the treatment facility which will allow it to be built. The permittee has a Certificate of Public Convenience and Necessity to operate as a privately owned public utility at this location.

31. So you are talking about so much drip area, 1 ½ inches per week, or something to that affect? So I presume that is not enough for the conventional system on any of these lots. Is that right?

The health department was uncomfortable approving conventional septic tanks and drainfields on these individual lots because the soils were marginal. However, upon closer examination by soil scientists, it was determined that for a highly treated effluent using drip irrigation these soils would work. Additionally, the drip application rate approved for this site, 1.1 inches per week, is approximately ½ of what is normally approved for these type systems. Based on these low application rates, the division determined that a drip irrigation system would work.

32. What is the failure rate?

The division has not experienced any failures of these decentralized systems to date. Because the treatment systems include mechanical and electronic components, they require a level of operation and maintenance that is greater than that required of a septic tank system. However,

22. How many of those are still in operation and still functioning properly? Have any of those had to be closed down? How many in the Knoxville area have closed?

The division's database indicates that there are 83 systems permitted in Knox (2), Blount (20), Hamblen (1) Sevier (43), Loudon (1), Roane (7) and Jefferson (9) counties. Based on the quarterly monitoring data, all of the drip irrigation systems are functioning properly.

23. Just suppose inflation is such that there is not enough money in the escrow account to cover repairs and/or replacement. Will that cost go to the utility or will that cost go to the residents that will have to pay out of pocket?

The permittee, IRM Utility, is responsible, as a condition of the SOP permit, to maintain and operate the system. However, ultimately the homeowner is going to have to pay into an escrow account an adequate amount to insure that the system components can be replaced at the end of their useful life. The TRA is responsible for seeing that there is enough money in that escrow account. If a situation occurs where the escrow account falls below what is needed to replace major components of the plant, then the utility must petition the TRA to increase the rates of the customers.

The Tennessee Regulatory Authority monitors and audits their utilities and they review depreciation schedules and determine escrow rates.

24. Can the permit be amended anytime?

Yes, an SOP permit can be modified subject to the division's approval at any time. Such a modification would first be published as a draft permit, and the action would be public noticed. Interested citizens would have the right to comment on the action and ask for a public hearing if so desired.

25. I would like to know how Mr. Cox became involved in our subdivision because all of the lots have been approved for septic. Why is he coming in to build this project?

The TDEC Division of Groundwater Protection acting through the Blount County Health Department had concerns regarding conventional septic tank and disposal fields for some lots. Mr. Cox was asked to evaluate these lots for suitability of a decentralized wastewater treatment system. A soil scientist employed by Mr. Cox performed an extra high intensity soil survey of the lots and determined that such a treatment system would work.

26. Does that mean that these lots can't be sold because there are health issues on these lots? How many lots are you referring to? Are these lots in Phase II?

Where conventional septic tank and drainfields are used for waste treatment and disposal, the soil on every lot must meet design criteria, excluding the soil area upon which the house must sit. For decentralized wastewater systems, one irrigation area may be selected for multiple lots using the best available soils for drip irrigation purposes. In addition, because of the high quality of the secondary treated effluent, some soils that would not work for a conventional system can be used for drip irrigation.

40. Before it goes operational is someone from the state going to check it out to make sure that to the best of their ability that it is operational and ready to turn on? Or, are we just going to turn it on and say day 91 and keep our fingers crossed until it happens?

The division reviews and approves the engineering drawings and specifications for each system. These documents must be stamped by a registered professional engineer. The division relies on the professional engineer to see that the system as installed in accordance with the approved plans and specifications will work. Division staff may be able to inspect the system during construction, but this cannot be guaranteed due to workload constraints. We have not experienced any problems with startup of these systems that have resulted in water pollution.

41. Once the installer is picked by the developer, how do we know that the installer is qualified? Or, are we relying on the developer to pick a qualified person?

The permittee is responsible to see that the system is installed in accordance with the approved engineering drawings and specifications. If the selected contractor is not meeting the above requirements, it is the job of the permittee's inspector to see that the work is stopped and any problem corrected.

42. Have you been able to pretty much hook up for homes I am talking about the essential plans?

The division has design criteria for collection systems. Engineering drawings and specifications for the collection system must be submitted to the division for approval. The utility is also subject to requirements of the Tennessee Regulatory Authority. In addition, the permit requires that the system be operated by a Grade 1 Collection System Operator. These operators must be certified by the Tennessee Water and Wastewater Operators Certification Board.

43. Who is responsible for the land where the treatment facility and the drip area are located?

The permittee, IRM Utility, will be responsible for the land and that land is going to be owned and controlled by IRM.

44. Will the drip system be on common area of the subdivision?

It will not be common area. It will be controlled by direct ownership by the permittee or by a perpetual easement held by the permittee.

45. Is there any chance to build homes on the drip field?

Absolutely not. The drip disposal area must be dedicated for that purpose only.

46. Where do the roads go through there then?

There will be no roads. The permittee will have an access easement.

because they produce a highly treated effluent, the division does not anticipate clogging of the drip irrigation field which is the major cause of failures for conventional septic tank systems.

33. Do they use any gravel around the pipes when they are installed? The pipes that go out to your drip irrigation are they just in regular dirt and how far down are they?

Manifold lines that go to the drip fields are placed in gravel. The drip lines are directly applied in the soil at 6 – 8 inches deep.

34. Do they work pretty well?

Drip irrigation lines work very well.

35. Is any of this area in any flood plain or anything by the brook? How will that affect the little brook that is there? Is it a wetland?

Drip lines will not be layed in the actual drainage way going down the middle of the property. During periods of heavy rainfall there will be runoff along this drain way. It will not affect the operation of the drip system.

36. Who is the developer?

The developer is Mr. Joe King.

37. Who will install the system?

The design engineer will have to submit engineering drawings and specification documents for this system. Those must be approved by our division. The developer and the permittee will select a contractor to construct the system. The system must be installed according to those approved drawings and specifications.

38. Who is going to monitor it and operate it? Who is going to hire somebody to install it? Who is going to see that the installation was done correctly? What regulatory authority is going to be onsite to make sure that it is put in correctly?

The permittee, IRM Utility, is responsible for operation and maintenance of the system. IRM has inspectors that monitor every system that goes in just like the installation of a septic tank is monitored. The permittee will be responsible to see that his plans and specifications are complied with. The division will follow-up with periodic inspections.

39. Is someone from the state going to sign off that this is available and that this is to the best of our knowledge operational before he takes it over? Or, are we going to have to find out after the fact that there is a problem. I want to see if you are anticipating or are you reacting when a problem develops?

Based on our experience with many other similar systems, the division does not anticipate that problems will develop. Our field office staff will make periodic inspections of the system.

47. Will the area be fenced?

At this time it is not planned that the drip irrigation area be fenced. The division requirements are either to provide fencing around the drip area or to provide disinfection of the wastewater. The IRM application stated that ultraviolet disinfection will be used. Thus, the permittee would not be required to fence the irrigation area.

48. Is it not in the best interest of everyone involved that you would own the property instead of having easement?

The division permit does not require ownership by the permittee. In lieu of ownership, a perpetual easement is acceptable. Ownership is also not necessary or required by the TRA. IRM chose to just have permanent easements on the property.

49. So that is considered commercial property?

The division does not specify how the property may be classified for tax purposes.

50. So the state does not regulate if you have to own the property?

The property must be either owned by the permittee or the permittee must have access under a perpetual easement that allows the use of the property for waste treatment and disposal.

51. Does Blount County not have any inspection on septic tanks or field lines as they go in? If they do, why can they not do the inspection on these systems as they go in?

The local county health department does inspect to some degree the installation of individual septic tank and field line systems. In time, there may be a comparable program for the inspection of these communal drip irrigation systems. An immediate problem is that the individual systems, which typically operate by gravity, and the drip irrigation systems that typically operate under pressure, are designed to different sets of construction specifications. For this particular project, the actual construction and installation will be routinely inspected by the utility. The utility welcomes the county's participation in these inspections.

52. I understand that, but it is just most counties and surrounding counties, the one thing that gets inspected is electric and the usually the septic system. It gets inspected to see if the field line is in right, the septic in right, and everything in correctly to operate the system properly. I guess I just don't understand why the county can't do that as well with this system to make sure all lines are in properly and they are done correctly.

Refer to Question #51.

53. It is a bad idea for the utility company to not own the property that the utility system is on. It is a bad idea for the contractor to own the property.

The contractor will not own the property. The permittee will either own the property, or will obtain a perpetual easement that allows the property to be used for wastewater treatment and disposal.

54. How long will it take for the system to be installed?

The permittee estimates that it will take approximately 3 months to install the system.

55. If the public sewer comes in then what happens to the system?

The division has no rule or policy that would require a properly operating decentralized wastewater treatment system to connect to another conventional sewer system. The division would address this situation based on the facts available at the time.

56. Some of us that live in lots that are not being served with this system, but we must live with it? How could our homes be served in the future if needed?

The division is proposing a permit for 14 lots. If the permittee desires to serve additional lots in the future, he must apply for a modification of this permit. As part of that application, he must demonstrate that adequate area of approvable soil is available to install the drip system to serve the additional lots. Assuming that this can be accomplished, the division would publish a new draft permit, and the permit modification would be subject to public comment. The permittee would also have to obtain the approval of the TRA.

57. Does Mr. King want to install the system prior to selling any land?

No final platted lots should be sold until the system is installed and ready to receive wastewater. We've been told that the Blount Health Department will not issue any health permits until we get a solution for the wastewater issue.

58. Can anything be done to the existing soil to make it acceptable for septic systems?

No. The division or the Health Department does not allow you to bring in soil to supplement the existing soil to make a septic system work. The only exceptions are where one is trying to solve a problem of an existing failing septic system.

59. What is the quality of the water discharged to the drip field?

The major indicator pollutants that the permit requires the permittee to measure are organic matter (measured as BOD5), ammonia, and a bacterial indicator (*E. coli*). The BOD5 is limited to 45 mg/l as a daily maximum. *E. coli* are limited to 23 colony forming units/100 ml. Ammonia and nitrate are not limited, however because of the large disposal area and low application rate these are not anticipated to be a problem. The quality of the treated water going to the drip field is significantly better than that coming from a septic tank. Following additional treatment by

biological processes, adsorption, and filtration in the soil, the water leaving the site will meet Tennessee's water quality for groundwater.

60. Do you have to pump solids out of the septic tanks? How often?

Yes. The typical is every five years, but the actual pump rate depends on the individual family size and household water use.

61. Who keeps the taxes on a piece of property that nobody owns?

The division requires that the permittee either own the property or obtain a perpetual easement to allow the property to be used for wastewater treatment and disposal.

DETERMINATION

The division has reviewed the questions and comments received from the public regarding the draft permit SOP- 07006. This document provides the response to those questions and comments. It is the determination of the division that a State Operating Permit will be issued for the Ashley Meadows Subdivision. Based on the comments received, the language in the draft permit will be changed to add a specific section specifying that the land upon which the treatment system is to be built must either be owned by the permittee or that the permittee must obtain a perpetual easement which allows the property to be used for wastewater treatment and disposal.

Please contact Ms. Monya Bradley at (615) 532-0664 or monya.bradley@state.tn.us to request additional copies of the NOD.

DATE: Sept. 25, 2007

Wade Mungby / for
Edward M. Polk, Jr., P.E..
Manager, Permit Section

